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Mark Scheme (Results)

Summer 2013

GCE Music Technology (6MT04)
Paper 01 Analysing and Producing

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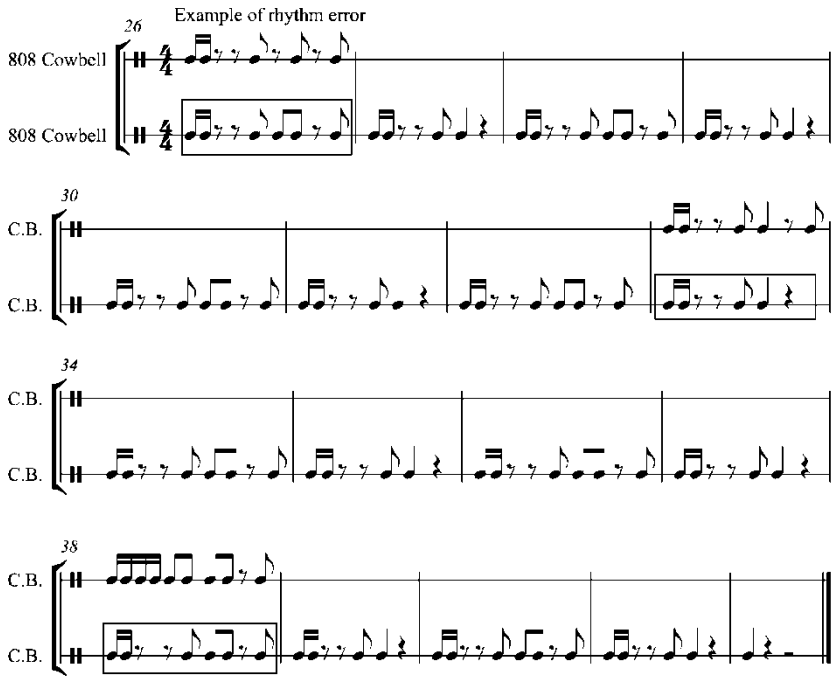
General Marking Guidance

- This mark scheme provides a list of acceptable answers for this paper. Candidates will receive credit for all correct responses but will be penalised if they give more than one answer where only one is required (e.g. putting an additional cross in a set of boxes). If a candidate produces more written answers than the required number (two instead of one, three instead of two etc), only the first answers will be accepted. Free responses are marked for the effective communication of the correct answer rather than for quality of language but it is possible that, on some occasions, the quality of English or poor presentation can impede communication and lose candidate marks. It is sometimes possible for a candidate to produce a written response that does not feature in the mark scheme but which is nevertheless correct. If this were to occur, an examiner would, of course, give full credit to that answer.
- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question Number	Question	Mark
1a	Listen to the drum part you have imported and compare it with the notation for the cowbell opposite. Between bars **26-42** there are **two** rhythmic errors in the cowbell notation. An example of a rhythm error is given in bar 26. • Identify **two** rhythmic errors in the notation. Circle the **entire bar**. • Notate the correct rhythm for the **entire bar** on the blank stave above.	4
	Acceptable Answers	
	 Allow alternative spelling of rhythm	

Question Number	Question	Mark
1b	What style are the drums in?	1
	Acceptable Answers	
	A Hip Hop	

<table>
<tr><th>Question Number</th><th>Question</th><th>Mark</th></tr>
<tr><td>1c</td><td>Complete the table below. Referring to the chord symbols, identify the notes in each chord used in the verse. An example is given.

Acceptable Answers

<table>
<tr><th>Chord</th><th>Notes in chord</th></tr>
<tr><td>Example: Am^{7}</td><td>A C E G</td></tr>
<tr><td>D^{6}</td><td>D F# A (1) B (1)</td></tr>
<tr><td>F^{9}</td><td>F A (C) (1) Eb (1) G (1)</td></tr>
</table>

Do not allow enharmonic spellings of triads or extensions.
Credit the extension note(s) if the letter names are correct for the triad or the triad uses enharmonic spellings.
Allow inversions.</td><td>5</td></tr>
</table>

Question Number	Question	Mark
1d	This guitar was recorded DI, then processed with a guitar amplifier simulator. In the table below, describe the function of each control. An example is given.	6
	Acceptable Answers	

Control	Description
Bass	• Low shelf EQ • Boosts/cuts the low frequencies
Drive	Input/volume/gain/level (1) Harmonic / overtone (1) distortion / overdrive (1) Pre-amp (1) Simulates soft clipping / saturation (1) of tubes / valves (1) Simulates hard clipping (1) of transistors / diodes (1) Reduces dynamic range / adds compression (1)
Microphone position	Ambience / reverb (1) increases with distance (1) Affects the brightness / frequency response (1) *[not timbre/sound/tone]* Centre is brighter than off-centre (1) Closer distance = increased low frequencies/warmth/bass (1) proximity (effect) (1) On axis = brighter / off axis = duller (1) Impulse response / convolution (1)
Tremolo rate	Varying / wobble / modulation / oscillation / LFO (1) of volume/level/amplitude (1) Measured in Hz/ms (1) or tempo synced (1)

Question Number	Question	Mark
1e	Which control has been adjusted from bar 26 onwards in the guitar part?	1
	Acceptable Answers	
	Drive	

Question Number	Question	Mark
2(a)	Create a bass sound that matches the timbre "bass example.wav". • Ensure that the octave matches "bass example.wav". • Use a square wave without any added effects. • Ensure that the filtering matches "bass example.wav". • Copy the envelope used in the example. Acceptable Answers **Bass timbre** Suitable octave AND correct transposition (1) Synth timbre (1) *Award 0 if any FX are added except reverb* Low cutoff frequency and no resonance (1) Suitable envelope is used and no glide / portamento (1) *Consider filter and amplitude envelopes.* *Ignore envelope of fading long note before chorus.* *Ignore fast attacks/releases causing clicks* If the bass is not soloed or the metronome is left on max 2	**4**

Question Number	Question	Mark
2b	Correct the pitches in **bar 30** so they match the loop in the rest of the chorus. Acceptable Answers Listen from 0:48-1:03 (8 bars after long note) Errors should be corrected 0:56-0:57 / 4 bars after long note. Assess equivalent location for candidate responses with more/less silence at the start of the CD track.	2

Mark	Correcting note pitches in bar 30
2	Bar 30 has the same pitches as the previous loop in the candidate's file
1	Bar 30 has the same pitches as the previous loop on the candidate's file but timing errors have been introduced OR 1 or 2 pitch errors
0	3 or more notes have incorrect pitch OR The MIDI file has not been altered OR Notes completely deleted
	If bass is not soloed and/or metronome is switched on with soloed bass then assess what can be heard clearly.

Question Number	Question	Mark
2c	In bars 24 and 25, add in pitchbend as indicated in the diagram below. Ensure that the pitchbend does not affect the remainder of the bass part.	4
	Acceptable Answers	
	Listen to 0:44-0:48 (or an equivalent location for candidate responses with more/less silence at the start of the CD track).	

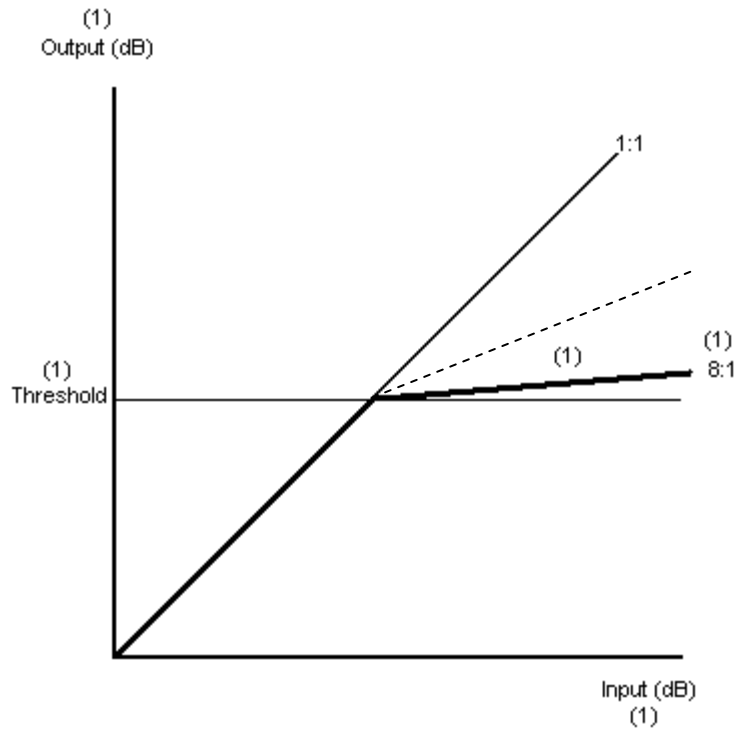
Pitchbend in bars 24-25
Pitchbend does not start immediately (1)
Pitch bends smoothly downward (1)
The pitchbend range is two octaves (1)
The pitchbend remains on minimum for the rest of the note AND does not affect the remainder of the bass part / glitch at the end / bar 26 (1)
Only assess what can be heard clearly e.g. if the bass is not soloed / envelope decays / slow drop in pitch Award max 1 for unsuccessful descending pitchbend where the above mark scheme cannot be applied. E.g. range less than 1 semitone; two simultaneous pitches

Question Number	Question	Mark
2d	Quantise has been used on this bass part to tighten the rhythm. Identify the most appropriate quantise value for this part.	1
	Acceptable Answers	
	1/8	

Question Number	Question	Mark
2e	In the table below, identify the pitch and velocity of each note indicated. An example has been given.	4
	Acceptable Answers	

Position	Pitch	Velocity
Bar 21, beat 1	D	127
Bar 22, beat 1	A (1)	126 (1)
Bar 23, beat 1	E (1)	124 (1)

Ignore octave number if given with pitch.

Question Number	Question	Mark
3a	Compression with a high ratio has been applied to the vocal to reduce the dynamic range. Illustrate this compression on the graph below using the following steps: (i) Complete the labelling of both axes. (ii) Label the threshold. (iii) The unprocessed signal is shown with a ratio of 1:1. Draw a line to represent high-ratio compression. Label it with a suitable compression ratio.	5
	Acceptable Answers	
	(i) In / input (1) out / output (1) (ii) Threshold correctly labelled. *[must relate to where the candidate has drawn the knee if not on horizontal line]* (1) allow values between -12 to -40 (iii) Correctly drawn high-ratio compression line below the dotted line *[accept soft knee curves] [allow a kink for high inputs]* (1) Compression ratio between 4:1 and oo:1 (1)  	

Question Number	Question	Mark
3b	A gate has been used on the vocals. Briefly describe what a gate does.	2
	Acceptable Answers	
	Cuts out / turns down sound (1) below the threshold (1) Expander (1) *[any reference to compressors or limiters renders whole response incorrect]*	

Question Number	Question	Mark
3c	From **bar 26** onwards, how has the robotic effect been produced on the vocal?	3
	Acceptable Answers	
	Autotune / pitch correction / Melodyne (1) *[don't apply SONC] [not pitch shift]*. Speed/response (1) set to minimum / fast (1) OR Tracking (1) set to fast (1) any ref to 'scale' / key signature / MIDI input (1) ----------OR---------- Vocal transformer (1) *[accept alternatives]* Robotize switched on (1) Automate the pitch (1) Automate the formant (1)	

Question Number	Question	Mark
3d	The "vocal.wav" file has some intrusive background talking and noise on the final few phrases. Clean up the vocal track so that only the singing can be heard. The sung vocal line must continue to the end of bar 41.	**4**
	Acceptable Answers	
	Listen to the final three phrases from 1:11 of task 2. The candidate should have replaced the final two phrases with corresponding phrases from elsewhere in the chorus. You will need to check the timing by listening to task 3. Listen to task 2.	

Mark	Preparation of vocal track — removing unwanted noises
4	Carefully edited vocal. The singing is intact without any sections cut out and with no unwanted noise present. The singing is in time.
3	The singing is in time. BUT The singing is intact with no abrupt cuts but with some unwanted noises still present / clicks. OR Small parts of singing have been cut off, but no unwanted noises present.
2	There are audible timing errors of more than a semiquaver. All of the noise has been cut out and only singing remains.
1	The noise has been cut out in between the singing but the noise remains under the singing. AND/OR Intrusive gating/fading
0	No attempt at cutting out any noise / completely silent track
Note: If vocal is not soloed or the metronome is switched on, assess what can be heard clearly up to max. 3.	

Question Number	Question	Mark
4a	Explain how vinyl records and cassette tapes are used to store and play back music and describe the problems that the consumer would encounter with them. Identify the benefits of audio CDs compared to these earlier formats.	16
	Acceptable Answers	
	Records and cassettes analogue / analog (1). Recordings degrade with multiple playing / recordings (1) Transducer (1) Wow / flutter (1), a modulation / varying of pitch / wrong pitch (1). For playing: Cassettes portable / Sony Walkman / Ghetto blasters/boom boxes / vinyl not portable (1). *Not: "breakable"* **Vinyl Records** First popular in the 1950s (1). The sound is stored on a single spiral (1) groove (1). Bumps / waveform (1) in the groove. Each side of groove has separate signal for stereo (1). Stylus / needle (1) sapphire/diamond tip (1). The vibrations (1) converted into electrical signal (1). Outer ¼ inch is the lead in (1) so the stylus can lowered onto the recording without damaging the recording (1). Lock groove (1) forms a complete circle the centre of the record (1). Not portable (1). Needs flat surface for player (1). Prone to feedback (1). Sound quality will deteriorate towards the centre of the record (1) because of the constant rotation speed (1) giving varying amounts of vinyl per second travelling under the stylus (1). RIAA curve (1) Low frequencies are reduced on the record (1) to reduce wide stylus movement (1). EQ applied on playback to return the low frequencies to their correct level (1). Therefore it is important to plug a record player in to the correct input on an amplifier (1). 7/10/12 inch (1). Speed / rpm of 33/45/78 (1). Records are prone to scratching (1) and dust (1) causing crackle (1), hiss (1), jumps (1). Vinyl creates a static charge attracting dust (1). Special dusters help reduce this static charge (1). The polythene sleeve helps reduce static charge / dust (1). Records are prone to warping (1), especially if exposed to heat (1),	

	Records are prone to <u>rumble</u> (1) at less than 30Hz (1). Frequency response of 30Hz-30kHz (1). 12 inch playing time is between 20 and 25 minutes per side / 40 to 50 minutes (1). This is why albums are a standard length (1). Many people argue that records sound better / warmer / more musical than CD (1). DJ (1) beat match/scratch/cue (1). Bands still release on vinyl for qudos / collectable (1). **Cassettes** First popular in the 1970s (1). Cassette tape is magnetic (1), coated with iron oxide (1) Description of electromagnetic induction (1). <u>Head</u> (1). The sound quality is not as good as studio tape / reel to reel (1). Reduced high frequency response (1) because the tape speed is slow (1) at 1⅞ inches per second (1) and tape is narrow *[must be linked to sound quality or number tracks]* (1). Capstan / pinch roller (1) controls speed of tape (1) Bands on the tape: Mono: 2 tracks / 1 track on each side (1) Stereo: 4 tracks / 2 tracks on each side (1) Multitrack: 4 tracks / tapes play one way (1) Common lengths of tape 60/90/120 mins (1). Cassette tapes are prone to <u>hiss</u> (1). Dolby noise reduction (1) boosted high frequencies when recording (1) and reduced them on play back (1). Saturation (1). Cassette tapes can stretch (1) Oxide wears off the tape (1) Leader tape (1). Cassette tapes are prone to <u>print through</u> (1) which is where the music is heard as an echo before it should play (1). High speed dubbing (1). Erase protection tabs (1) Cassettes should not be stored in strong magnetic fields because it will slowly erase the tape (1).	

	Cassette tape players needed to be cleaned (1) with alcohol / head cleaner cassette (1). Tapes got snapped / chewed / eaten / the tape came out of the case and got tangled around the heads (1). 120 minute tapes particularly prone to these problems (1). <u>Degaussing</u> (1) removes the build up of magnetism on the tape head (1) reducing distortion / improving sound quality (1). Difficult to cue/wait for rewinding / locate tracks (1). Three main types. The higher the type number, the better the frequency response / signal to noise ratio / sound quality (1): Type I / normal / Type II / chrome / Type IV / metal (1) Tape bias (1). 70 μs / 120μs (1) Recordable with domestic equipment led to fears of home piracy of music (1). Used for home recording (1). Four/eight track (1) portastudio (1). Bleed / crosstalk (1). **Benefits of CDs** CDs became available in the early 1980s / were more popular by the 1990s (1). Better signal to noise ratio / less noise / wider dynamic range (1). Don't degrade with multiple playings / recordings / over time (1) Better frequency response (1). Cheaper to manufacture (1). Digital / sample rate (1). No compression (1). Fast cueing / access of tracks / doesn't need turning over (1). Easy to import music into software / play on computer (1). Longer playing time (1) *[must compare to vinyl]* More portable (1) *[must compare to vinyl]* *Not: holds more music / mp3 / data* *Not: "better sound"* *Don't accept opposites of problems with cassettes/vinyl if already credited.*	

Question Number	Question	Mark
4b	On the insert provided the picture shows an audio interface. Explain the technical features and specifications that can be seen in the picture.	16
	Acceptable Answers	
	All comments must relate to the correct knob/socket. Low latency (1) **<u>Sample rates</u>** (1) LED (1) 44.1kHz or 88.2kHz for CD / red book (1). 48kHz or 96kHz for DVD (1). Analogue to digital converter / digital to analogue converter / ADC / DAC (1). The <u>bit depth</u> (1) is 24 bit. A higher bit depth gives less noise (1) and wider dynamic range (1). Higher sample rate improves the high frequency response (1). 1U / rackmounted (1) **-20dB** <u>Pad</u> switch (1) reduce the sensitivity / volume (1). Helps prevent distortion (1) if recording loud sources (1). **48V** <u>Phantom power</u> (1) used to supply power to condenser / capacitor microphones (1) *[must be qualified with condenser; ignore SONC with dynamic / ribbon]*. Individual phantom power switches which is essential for protecting ribbon mics (1). **<u>Gain</u>** <u>/ trim</u> knob (1) prevents distortion (1) reduce noise / good signal to noise ratio (1) <u>gain structure</u> (1). **Analog IN** Level / meters (1) LED *[don't credit twice]* (1) 5 segment (1) red if there is distortion (1) Yellow or yellow is best / to give a good signal to noise ratio / get enough signal (1) and leave adequate headroom (1) dB (1) **Headphone socket:** TRS / jack / stereo (1) *[don't credit twice].* Tip left / Ring right (1). Foldback / monitor / cue mix (1). **Volume control:** no marks **Power** switch / socket (1). Kettle socket (1) IEC (1) C14/C13 (1). Internal power supply	

	is more reliable than external power adaptor (1). **Digital inputs** and outputs (1) 8 (1): ADAT / lightpipe (1). JIS-F05 (1). Two cables are required for 96kHz (1). Used to connect to other digital audio equipment such as a digital mixing desk/ADAT tape recorder *[credit any other valid example]* (max 1) **MIDI** Musical Instrument Digital Interface / GM (1) used to connect other audio equipment such as a synthesiser / FX unit *[credit any other valid example]* (max 1) DIN (1) **Firewire:** connect the interface to the computer / transferring data / digital (1). Firewire is fast / reliable bandwidth (1). Daisy-chaining (1). Firewire 400 (1). May need 800 adapter (1). Could be used for power (1). After 2000 (1). **Main output** Stereo (1) which consists of two TR / TRS / jack (1) *[don't credit twice].* Sent to monitors / control room etc (1). Ref to balanced / unbalanced (1). **Inputs** Four inputs (1). Pre-amp (1). Not suitable for full mic'ing of drum kit because not enough inputs (1). Accept any valid use for 4 inputs: e.g. stereo recording (max 1) Combo / combi inputs (1) locking tabs (1): Female (1) XLR / cannon (1) usually used for microphones (1) TRS / tip-ring-sleeve / jack (1) usually used for instruments such as electric guitar/synths / DI (1). The inputs are balanced (1) which reduces noise / hiss (1) *accept any brief explanation of how a balanced signal works:* two opposite polarity signals / cancelling out noise / destructive interference (1).	

Section B

5 You should now have the following tracks imported on the computer:
Electric guitar, drums, vocal and bass.

Produce a final balanced stereo mix with the following features:

"task 3 mix.wav" is worth full marks and is what the candidate should be aiming for with "track 3" on their CD.

<table>
<tr><th>Question Number</th><th>Question</th><th>Mark</th></tr>
<tr><td rowspan="3">5(a)</td><td>Apply a high pass filter to the guitar part.
• Only bars 14 and 15 should be affected.
• Use a high pass filter with a cut-off frequency of 1000Hz with and the steep roll-off.
• The filter should not affect the remainder of the guitar part.</td><td rowspan="3">3</td></tr>
<tr><td>Acceptable Answers</td></tr>
<tr><td>
<table>
<tr><th></th><th>Management & control of the guitar HPF</th></tr>
<tr><td>3</td><td>A HPF with a cut-off frequency of 1000Hz has been applied in bars 14-15. The remainder of the guitar part is unaffected by the HPF.</td></tr>
<tr><td>2</td><td>A HPF has been applied in bars 14-15 that makes a noticeable difference to the tone while the remainder of the guitar part is unaffected by the HPF, but:
the cut-off frequency is incorrect / allow BPF
AND/OR
there is an audible glitch/louder where the filter changes.</td></tr>
<tr><td>1</td><td>Resonance approaching self oscillation
LPF
OR
Other phrases of the guitar part are affected by the filter.
OR
Not all of bars 14-15 are filtered</td></tr>
<tr><td>0</td><td>There is no audible filter on the guitar track.
OR
No mix present on CD.</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Question Number</th><th>Question</th><th>Mark</th></tr>
<tr><td>5(b)</td><td>Apply a gate to the guitar part.
Set the side chain so that the gate is triggered by the drum part.
Set the gate so that the rhythm of the guitar changes; only playing when the drums play. The gate must mute the guitar during the rests within the drum part.
Ensure that there are no false triggers of the gate and the guitar chords are not cut too short.
Acceptable Answers
<table>
<tr><th></th><th>Management & controlling gating of the guitar</th></tr>
<tr><td>3</td><td>Keyed gate: Guitar only plays simultaneously with the kick drum.</td></tr>
<tr><td>2</td><td>Keyed gate: The rhythm is correct, but only the attack of the guitar can be heard or release too long / fades.</td></tr>
<tr><td>1</td><td>Gate not sidechained with the drums.
OR
Incorrect rhythm.</td></tr>
<tr><td>0</td><td>There is no audible evidence of gating on the guitar track.
No mix present on CD.</td></tr>
</table></td><td>3</td></tr>
</table>

<table>
<tr><th>Question Number</th><th>Question</th><th>Mark</th></tr>
<tr><td>5(c)</td><td>Apply automated panning to the word “stereo” in bar 23 of the vocal part.
The word “stereo” should move smoothly across the stereo field from right to left.
Ensure that all other bars are panned to the centre.
<table>
<tr><th></th><th>Acceptable Answers</th></tr>
<tr><td></td><td>
<table>
<tr><th></th><th>Management & control of the vocal panning automation</th></tr>
<tr><td>3</td><td>Panning automation with the vocal panning from right to left as directed</td></tr>
<tr><td>2</td><td>Panning automation with the vocal panning across the stereo field in some way, audible join e.g. more than a semiquaver early / late
OR
Pans left to right</td></tr>
<tr><td>1</td><td>Poorly managed panning automation with the vocal panned in a single position other than centre / erratic panning.
AND/OR
The vocal does not reset to centre / other bars affected by panning.
AND/OR
Audible glitches in panning at the beginning or end of bar 23</td></tr>
<tr><td>0</td><td>There is no audible panning automation.
OR
No mix present on CD.</td></tr>
<tr><td></td><td>Max 1 if any other track is widely panned other than centre.</td></tr>
</table>
</td></tr>
</table>
</td><td>3</td></tr>
</table>

Question Number	Question	Mark
5(d)	Apply reverb to **each** of the four parts. • Use a 1.5 second reverb time. • The reverb should not be intrusive. • The guitar should have the most reverb and the bass the least.	**3**
	Acceptable Answers	

	Application of reverb
3	The guitar has the most reverb; the bass has the least. Overall reverb is less than the standardisation audio.
2	Overall reverb is slightly more than mark scheme audio. OR Use of reverb with some misjudgements. OR Reverb bypasses in some parts of the track. E.g. dry guitar during the filtering.
1	Serious misjudgement on 1 track or more. AND/OR Wrong effect added on any track except bass. AND/OR Reverb has been gated on the guitar.
0	No evidence of reverb being applied to any track. OR No mix present on CD.

Question Number	Question	Mark
5(e)	Balance the mix. • The balance should suit the style of the music. • Ensure that all of the tracks can be heard clearly.	**3**
	Acceptable Answers	

	Balance and blend
3	Consistently well balanced and effectively blended across all parts of the mix. Vocals sit on top of mix.
2	Most tracks are well balanced with some masking. A few misjudgements, e.g. guitar louder than the vocal.
1	Balanced so that one track is barely audible. E.g. words of vocal are not audible OR Not all tracks present/additional tracks.
0	No mix on CD OR Only a single track present.

Question Number	Question	Mark
5(f)	Produce a final stereo mix. • Ensure that the mix output is at as high a level as possible. • It should be free from distortion. • **Do not** limit or compress the mix output. • Ensure that the beginning of the music and the reverb tail are not cut off. • Ensure that silences at the beginning and end do not exceed **one** second.	**3**
	Acceptable Answers	

	Presentation of mix
3	Beginning and end of mix does not cut out music or reverb tail. The beginning should have 0.2-1 seconds of silence before the music starts. The mix output should be near normalised with no distortion.
2	Beginning and end of mix does not cut out music or reverb tail. The beginning has a silence of greater than 1 second. OR The mix output is too low OR is compressed OR there is some slight distortion.
1	Obviously chopped start or ending. OR The mix output is unacceptably low or too high (distorted). OR Excessive use of mix compression causes pumping OR metronome has not been turned off. OR Any part is noticeably out of sync / out of tune IGNORE previously assessed work: Vocal timing in final three phrases Bass pitches Bass timing at bar 30
0	No mix present on CD.

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